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STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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February 28, 1995

Mr. Dean Fowler  
Spokane County Utilities  
West 1026 Broadway  
Spokane, WA 99260

Dear Mr. Fowler:

Re: Colbert Landfill/EPA-Ecology Review of County's  
Response to Ecology-EPA Comments of  
December 5, 1995/Issues for Resolution

Thank you for Spokane County's January 30, 1994, response to Ecology and EPA's comments of December 5, 1994. The depth and breadth of the response enabled us to resolve the following numbered comments regarding the Draft Aquifer Management Plan: Numbers 1, 3, 4, 5, 7, 10, 11, 12, 13, 14, 18, 21, 24, and 27. The remainder of our comments on the Management Plan require clarification and dialogue. Our position regarding the County's response to these comments is summarized as "Issues," which are described in this letter.

Regarding the computer modeling comments: if the computer model is not going to be used for compliance purposes, the computer model comments are not an issue at this time. However, we want the County to clearly delineate the objectives of the model, in writing, to Ecology and EPA so we can confirm the objectives to be non-compliance in nature.

Controversy over the location of most of the monitoring wells in relation to the capture zones is deferred, pending collection of additional field data. However, the location of two monitoring wells in the south system and two in the east/west system do not appear to satisfy monitoring requirements of the consent decree. We do not believe monitoring data from these wells is suitable for compliance purposes. We believe the remedy requires monitoring wells that are downgradient of the capture zone. Two cross-gradient/down-gradient monitoring wells, which were located in 1992, are located in a down-gradient position.

The control on contaminant migration has data gaps that need filled. Existing data may remedy some gaps but in some instances, additional sampling may be necessary. We are also open to the concept of reduced sampling in areas where a reduction can be justified. We still have concerns over the data

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## ISSUES

### 1. DATA BASE FOR MEASURING EXTRACTION DRAWDOWN:

Target drawdowns, based on the computer model, can be used as a management tool and for non-compliance issues and can be incorporated in quarterly reports. Target drawdowns can not be used for a compliance issue unless Ecology and EPA review the issue and concur in writing. During our meeting the County should identify the circumstances where target drawdowns are intended to be used.

Regarding target drawdowns and the concept of a baseline for drawdowns, we have concern over the combination of data bases that are proposed. The 1994 third quarter report states that May 1994 data will serve as the drawdown baseline but no justification is given for this selection. This data base differs from the March/April 1992 data base used to calibrate ground water flow for the computer model. The third quarter report also identifies a different data base outside the influence of pumping that will be used to estimate seasonal effects on drawdown.

Surely there is a way to avoid using the May 1994 data as the baseline for the duration of the project. A baseline for a project of this scope and magnitude deserves more than a single set of data. Can this third data base, outside the influence of pumping, be used to create a baseline?

Also, the reported capture zones, which is a compliance related issue, was based on the computer model. Now that pumping data is available, the capture zone should be reevaluated based on pumping data.

In summary, the County should justify at the meeting, and in writing, its use of the combined data bases by demonstrating that the bases are consistent in regard to ground water flow direction and the distribution of hydraulic head. The County should also present a strategy for reevaluating the capture zones based on pumping data.

### 2. USES OF COMPUTER MODEL:

If the model is to be used solely for non-compliance purposes, then the comments of our December 5 1994, letter are not an issue at this time. However, we want the County to clearly delineate the objectives of the model at the meeting, and in writing, to Ecology and EPA so we can confirm the objectives to be non-compliance in nature. We anticipate the model to be a management

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tool for operating the extraction system and trust that the model will be refined with current data.

Using the model to confirm monitoring well locations relative to the capture zone has compliance implications and is beyond the scope of a management tool. We believe field data should be used to verify the locations. Four monitoring wells are reported not to be in the capture zone and are discussed in Issues 4 and 5 below. In locating new monitoring wells we would want to use field data rather than the model.

Although many of the comments regarding the model were addressed others were not. As stated above, the body of comments are not an issue, provided the model is used for non-compliance purposes. If the County wants to address the comments we suggest a separate meeting for that purpose.

### 3. CONTAMINANT MIGRATION EAST OF THE LANDFILL:

The three reasons cited in Section 4.2.6 and 4.3.2.2, in the Phase I engineering report, for contamination migrating east and northeast of the landfill in the lower aquifers are: 1) lateral flow to the east along a thin extension of the Lacustrine Aquitard, 2) domestic well pumping or 3) a combination 1 and 2.

This potential migration, however, appears to be dismissed. Part of the rationale for dismissal is that apparently, no transmissive units east of the landfill have been located. What is the basis for stating that there are no transmissive units east of the landfill, and how far east does the zone of non-transmissive units extend? If there are no transmissive units, why are there domestic wells east of the landfill?

Ground water monitoring northeast of the landfill employs mostly domestic wells which have demonstrated a record of low concentration or non detects. How efficient are these domestic wells for representing the lower aquifer? To answer this question we need the elevations of the well completion intervals and the elevation of the ground surface. At a minimum, we need the well completion logs. Please either provide us with the elevations and completion logs or refer specific sections or appendixes in the submitted documents that contains this information.

Groundwater east of the landfill, as depicted in Figure 2 of the January 30 response, has not been sampled, even though there are available sampling points. According to Figure 2, apparently no sampling has taken place in monitoring wells east of the extraction wells, all of which have shown concentrations of constituents of concern over performance standards. In

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particular, Figure 2 shows six monitoring wells east of the extraction wells that have not been sampled.

Also needed to ascertain the domestic wells's efficiency in representing the aquifer is the quality control measures used in sampling the wells. We need to know where in the domestic system the sample is taken. Is the sample taken directly from the well, or is it taken from the tap after the water has passed through a pressure system? What is the rate of flow during which the sample is taken and what standard operating sampling techniques are employed? Please provide us with this information or refer us to specific sections or appendixes in the submitted documents that contain this information.

We also believe there are other domestic wells east of the landfill along Singletree Lane, Wagon Road, and Big Meadows Road that have been sampled in the past, and if completed in the lower aquifer, would provide critical information regarding delineating the east boundary of the plume. Please supply us with the locations and completion logs of domestic wells in this area or provide us with specific references in submitted documents where we can find this information.

In regard to the discussion of contaminant migration east of the landfill, the actual groundwater elevation contours shown in Figure 6 of the January 30 response are pre-extraction but do not present a ground water flow pattern that explains the migration. If extractions from domestic wells were causing the migration then contour lines would reflect flow to the wells consistent with plume development. The County must provide a clearer explanation for the migration supported by the field data.

In summary, please be prepared to discuss the following at the meeting:

- A) Given the reported possibility of eastward contaminant migration and the lack of chemical analysis data for control on eastward migration, our position is that incorporating additional groundwater sampling east of the landfill on a contaminant distribution map is necessary.
- B) Including domestic well sampling in quarterly reports requires our review of well completion information and QA/QC sampling procedures.
- C) We want the locations and completion details of domestic wells east of the landfill.
- D) The County must provide a clearer explanation for contaminant migration supported by field data.

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#### 4. LOCATION OF SOUTH SYSTEM DOWNGRAIDENT MONITORING WELLS:

Wells CD-34A and CD-31A are reported within the south extraction system's zone of capture in the Final Groundwater Plan of August 7, 1992, and in the Draft Aquifer Management Plan of 1994. These monitoring wells may provide system operational data but they are not considered downgradient compliance monitoring wells.

Wells CD-34A and CD-31A were installed before the August 7, 1992 final plan was developed. The Phase I engineering report of December 30, 1991, implies on page 2-2 that CD-31A was installed between August 1989 and August 1990. We could not find a date of installation for CD-34A but believe it was in 1990 or further back in time. Consequently, the wells were installed before the computer model was developed. The time of installation of the wells indicates that the purpose for installation was most likely informational and was not to fulfill design requirements for downgradient monitoring.

Ecology and EPA did not direct the County to install Wells CD-31A and CD-34A as down-gradient monitoring wells. The County installed these wells as part of an exploration program and then in 1992 asked Ecology and EPA that they be included in the down-gradient monitoring system. It appears that until recently Ecology, EPA and Spokane County did not realize that the location of these wells is not down-gradient of the capture zone.

Regardless of the record of review and concurrence, wells CD-34A and CD-31A, are reported twice to be located within the capture zone. This location is inconsistent with Consent Decree requirements. Also, the location is in the very center of the plume, which requires monitoring. We do not consider analysis data from these wells to be compliance monitoring data. We also find that because of the location we can be challenged for not implementing the Consent Decree.

In summary, we believe two additional wells down-gradient of CD-34A and CD-31, and the capture system, would be required to meet Consent Decree requirements. At our meeting we would like to discuss the location of monitoring wells and determine a strategy to remedy this matter.

#### 5. LOCATION OF EAST/WEST SYSTEM DOWN-GRADIENT MONITORING WELLS:

Similar to the above, the location of wells CD-44 and CD-45 are also shown in the final monitoring plan of 1992, and the draft aquifer management plan of 1994, to be located within the capture zone. Wells within the capture zone are not considered down-gradient for Consent Decree compliance purposes.

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Wells CD-44 and CD-45 were already constructed when the final monitoring plan was being put together. It appears from Section 2.1.1 of the Phase I engineering report that these two wells may have been installed between 1981 and 1982 by Maddox and Associates. At any rate, the timing for installing the wells indicates the purpose of the wells was for informational purposes and not to fulfill design requirements for down-gradient monitoring.

Ecology and the EPA did not direct the County to install Wells CD-44 and CD-45 as down-gradient monitoring wells. These wells were originally installed for information purposes. Later, in 1992, the County proposed that they be included as down-gradient monitoring wells. Regardless of the record, the locations of the wells, as reported, does not meet consent decree requirements. We do not consider analysis results from these wells to be compliance monitoring data. We also find that because of the location, we can be challenged for not implementing the Consent Decree.

In summary, we believe new downgradient monitoring wells will have to be installed to meet consent decree requirements. At our meeting we would like to discuss the location of monitoring wells and determine a strategy to remedy this matter.

#### 6. CROSS-GRADIENT/DOWN-GRADIENT MONITORING;

The final groundwater plan of August 1992 places monitoring wells CD-45 and CD-48 in both a down-gradient and cross-gradient position for monitoring the west extraction system. The locations of the wells was largely based on the distribution of contamination and migration of contamination in the 1992 report. However, the distribution and migration were in turn based on the computer model. Today our field data base for the site is much greater than in 1992. Consequently, our understanding of the site today has been greatly enhanced and has changed since 1992.

The most significant change since 1992 has been a modification of the west system extraction system, due to new field data. This change and other significant changes in site characteristics are shown below. We have listed the changes in reference to response No. 8 of the County's in the County's response package.

The changes in field data since 1992, and our new understanding of the site since 1992, have relegated obsolete the dual, cross-gradient/up-gradient function of wells CD-45 and CD-48. These wells are in a down-gradient position relative to observed ground water contamination and ground water flow as evidenced below in A and B. The utility of these wells compared to their projected

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utility in 1992, is also reduced given the numerous changes to the system listed below.

Consequently, Ecology and EPA now consider these wells down-gradient wells and find that no cross-gradient monitoring of the west system, as required by the consent decree, is presently being undertaken.

While we find that no cross-gradient monitoring is presently being undertaken, we do not, at this time, require the County to install cross-gradient wells to replace CD-45 and CD-48. Rather, we hold the two cross-gradient wells in reserve and would request their installation later if needed.

Ecology and EPA will agree to have these two west system cross-gradient wells "banked" with the other wells which have not been installed based on work plans. The total number of wells in the "bank" now stands at six. The other two discretionary monitoring wells are referenced at the bottom of page 6 in the 1992 report. In addition, there are also two extraction wells that were placed in the well bank, which are referenced in our December 17, 1993, letter to the County.

We now want the County to acknowledge, in writing, that the two cross-gradient monitoring wells for the west system are in the "bank" with the other two other down-gradient monitoring wells and two extraction wells. Ecology and EPA may make use of these wells to meet Consent Decree requirements.

The changes since 1992 follow:

A) The ground water contours in Figure 6 of the response shows the groundwater gradient north of the landfill to be much more to the southwest than the westward groundwater contours in Figure 1-6 of the final groundwater monitoring plan of 1992. The Figure 6 contours, along with Figure 2, which presents new contaminant information relative to 1992, place well CD-45 in a downgradient position relative to contamination rather than a cross-gradient position.

B) Comparison of Figure 2 and Figure 6 in the response, which are new compared to the 1992 plan, show that well CD-48 is down-gradient of reported contamination in domestic wells in the Wahoo Road area. (Incidentally, the supplemental monitoring well southeast of CD-48, which could shed more light on the migration, has not been sampled.)

C) Contamination has been reported in well CD-44, which is both north of well CD-45 and the northern boundary well. Although

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this reported contamination is low, it strongly implies that contamination is migrating around the compliance well network.

D) A mile-wide-front of contamination entering the Little Spokane River, west of the landfill, has been observed and it may be transported there by the Lower Aquifer.

E) A granitic anomaly was discovered that required a new modeling effort and a new location of an extraction well.

F) Extraction wells CP-W4 and CP-E4 were not constructed due to logistical problems and their construction was put in the "bank" by Ecology and EPA.

G) Vinyl chloride has been detected (see Issue 12 below) in groundwater and, based on experience at other sites where chlorinated solvents are being remediated, its concentration will most likely increase.

H) CP-E1 is operating at 100 gpm above its upper bound, design flow rate to achieve greater source removal. Is this still an acceptable parameter?

In Summary: Two extraction wells are in the "bank" along with four monitoring wells. Installing these wells may be required by Ecology and EPA to meet compliance monitoring requirements.

#### 7. CONTROL ON CONTAMINANT MIGRATION:

The County's suggestion to integrate domestic well sampling into quarterly reporting for remedial action is an excellent idea because it will provide increased control on contaminant distribution. In order for this to occur we need to be convinced that the domestic wells are representative of the aquifers to be monitored.

Please demonstrate at the meeting and in writing that the domestic wells to be utilized for quarterly reports are completed in the aquifers they are intended to monitor. This demonstration should include elevations of completion intervals in the wells and the elevation of the ground surface. At a minimum, the well completion logs should be included in the demonstration. If this information for demonstration is in submitted documents, please reference the section containing this information.

#### 8. FIGURE 1

We appreciate the County's compilation of Figure 1 in the January 30, 1995 response. Our concern is that figure is intended to be



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a contaminant distribution (plume) map but it requires clarification to meet this purpose. The clarification is: a) the domestic wells in sections 10, 11, 14, and 15 need confirmation that they are completed in the upper aquifer, and b) data from the supplemental monitoring wells need to be included because this data is critical for defining the distribution. Regarding the supplemental monitoring wells, we believe the interested public will surely ask why they are not included.

Please demonstrate at the meeting and in writing that domestic wells used for Figure 1 are completed in the upper aquifer. This demonstration should include elevations of completion intervals in the wells and the elevation of the ground surface. At a minimum, the well completion logs should be included in the demonstration. If this information for demonstration is in submitted documents, please reference the section containing this information. If the supplemental wells were sampled, please include this data. If the wells have not been sampled, or if the data is too dated, please make a commitment at the meeting to sample the supplemental monitoring wells and include the analysis results on a revised Figure 1.

#### 9. FIGURE 2

We appreciate the County's compilation of Figure 1 in the January 30, 1995 response. Our concern is that figure is intended to be a contaminant distribution (plume) map but it requires clarification to meet this purpose. The concern is: a) the domestic wells in sections 2, 10, 11, 14 and 15 need confirmation that they are completed in the lower aquifer, and b) data from the supplemental monitoring wells need to be included because the data is critical for defining the distribution. Regarding the supplemental monitoring wells, we believe the interest public will surely ask why they are not included.

Please demonstrate at the meeting and in writing that the domestic wells are completed in the lower aquifer. This demonstration should include elevations of the completion intervals in the wells, and the elevation of the ground surface. At a minimum, the well completion logs should be included. If this information for demonstration is in submitted documents please reference the section containing the information. If the supplemental wells were sampled, please include this data. If the wells have not been sampled, or if the data is too dated, please make a commitment at the meeting to sample the supplemental monitoring wells and include the analysis results on a revised Figure 1.

#### 10. FIGURES 3,4 AND 5:

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These figures are excellent for conveying information. We ask that the wells be confirmed as monitoring the aquifers they are intended to monitor. As above, please demonstrate that the wells are monitoring the appropriate aquifer.

#### 11. OTHER ISSUES:

A) The highest concentration of TCA in Figure 1 is along the Little Spokane River in Section 10. There are also numerous detections of TCA along the river from the 1.5 parts per billion in the middle of Section 10, to the 2.3 parts per billion near the middle of Section 3. It appears as if TCA is entering the river along a one-mile-front.

Although these concentrations entering the river are below performance standards, the one mile front and high concentration of TCA indicates that there is a significant pathway for contaminant migration from the landfill in the upper aquifer is to the west, toward the Little Spokane River. This runs counter to the discussion in Comment No. 9 of the January 30, 1995, response in which the westward component of ground water flow is deemed to be minor. This pathway has implications for public health.

In Figure 1, none of the monitoring wells west of the landfill show sample analysis results. We believe the monitoring wells should be sampled to track the contamination. Also, the high occurrence of solvent in domestic wells raises the possibility of vinyl chloride being in the wells.

In conclusion, we believe the magnitude of contamination in the upper aquifer, west of the landfill, requires more efficient tracking, and that the risk of vinyl chloride in groundwater needs evaluation. Please come to the meeting prepared to discuss the tracking of contamination and the risk of vinyl chloride.

B) Given the above comment, and the assumptions that the lower aquifers are discharging to the Little Spokane River, we believe it within the realm of possibility that the contamination appearing in the domestic wells along the river may be transported there through the lower aquifer. What is the County's assessment of this? If contamination is assumed to be getting to the domestic wells via the lower aquifer, does this require a new strategy for remediation?

C) Regarding quarterly reports: we would like a contaminant map included, showing the sample analysis results and a delineated plume boundary in the similar manner that was employed in Figures 1 and 2 of the January 30, 1995 response. At the meeting we need to determine the extent of monitoring to be employed for the plume map.

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D) Can a method other than target drawdowns be used for determining the physical impact of extraction on ground water supplies?

E) Baseline determination is not entirely clarified merely by referencing the Consent Decree because the wells to be used have not been agreed upon. The Consent decree called for a mutually acceptable time to begin sampling, and there had been no mutual agreement. Also, if the time between sampling events is not uniform, will a time-weighting factor be applied to the sample results?

F) Regarding Figure 4, supplemental monitoring wells are indicated as "not regularly sampled." It would appear from Figure 1 that they have never been sampled. Have the wells been sampled? If so, where is the data presented?

G) Regarding Figure 5, supplemental monitoring wells are indicated as "not regularly sampled." It would appear from Figure 2 that the wells have never been sampled. Have the wells been sampled? If so, where is the data presented?

H) In comparing the modeled and measured contours in Figure 5, we find the measured contours show flow to the southeast to east in the vicinity of the extraction well system. The modeled flow is to the south. At our meeting please reassure us that this constitutes no problem in interpreting the efficiency of the capture system.

## 12. VINYL CHLORIDE (REPORTED IN THIRD QUARTERLY REPORT):

The 1994 third quarter report reveals the presence of vinyl chloride in the lower aquifer over the federal drinking water standard of 2 parts per billion. While the Consent Decree does not specifically mention vinyl chloride, had it been known that vinyl chloride was a constituent of concern, it would have been inconsistent not to include vinyl chloride in the performance standards.

Of prime importance is the protection of human health. Are measures in place to protect groundwater users from vinyl chloride? Have any domestic wells been tested for vinyl chloride? In answering this question we suggest an expeditious data review to determine the extent of vinyl chloride in groundwater. If the data review can not ascertain the extent, then a sampling program will have to be undertaken. Please come to the meeting prepared to answer the above question, or describe a strategy to answer the question.

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**13. LANDFILL CLOSURE ISSUES:**

**A. Status and Schedule for Closure:** Regarding the January 10, 1994, Memorandum of Agreement between the County and Ecology that outlines landfill closure, we want, by March 15, 1995, a document explaining the County's current situation, strategy, and milestone schedule, for closing the landfill in accordance with WAC 173-304, by the end of 1996. If this submittal date is not agreeable, please provide an explanation in writing by March 10 and propose a new submittal date.

**B. Groundwater monitoring:** Under 173-304-490 closure of a landfill requires groundwater monitoring. Groundwater monitoring requirements are found in WAC 173-304-490. Closure of the Colbert Landfill must fulfill these requirements. The County's document(above) should explain the current situation, strategy, and milestone schedule for meeting the ground water monitoring requirements.